

HeatMaster®

**HM**

## *Installation, operating and servicing instructions*

**HeatMaster® 60N / 70N / 100N**

**HeatMaster® 60N / 70N / 100N**

*With ACV BG 2000-S premix gas burner*

**HeatMaster® 60N / 70N / 100N**

*With ACV BM oil burner*



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<b>SPARE PARTS</b>	See at the end of this manual
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# WARNINGS

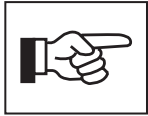
## WHO SHOULD READ THESE INSTRUCTIONS

These instructions should be read by:

- the specifying engineer
- the installer
- the user
- the service engineer

## SYMBOLS

The following symbols are used in this manual:



Essential instruction for the correct operation of the installation.



Essential instruction for the safety of persons and the environment.



Danger of electrocution.



Risk of scalding

## RECOMMENDATIONS



- Please, carefully read this manual before installing and commissioning the boiler.
- It is prohibited to carry out any modifications to the inside of the appliance without the manufacturer's prior and written agreement.
- The product must be installed and serviced by trained engineers, in compliance with current standards.
- Any failure to follow instructions relating to tests and test procedures may result in personal injury or risks of pollution.
- To guarantee safe and correct operation of the appliance, it is important to have it serviced and maintained every year by an approved installer or maintenance company.
- In case of anomaly, please call your service engineer.
- Despite the strict quality standards imposed by ACV during the manufacture, inspection and transport of its appliances, you might notice some errors. Please report immediately any fault to your approved installer.

- The parts may only be replaced by genuine factory parts. You will find a list of the spare parts and their ACV reference number at the end of this document.
- The gas burners are preset in our factory for use with natural gas [equivalent to G20].
- Specific regulation applicable in Belgium [for the gas burners]: The CO<sub>2</sub> level, the air and gas flows and the gas / air ratio are factory set . Any field adjustments of those settings is not allowed in Belgium.



- It is important to switch the boiler off before carrying out any work.
- There are no user accessible parts inside the boiler casing.

## APPLICABLE STANDARDS

The appliances carry the **CE** mark in accordance with the standards in force in the various countries (European Directives 92/42/EC "Efficiency", 90/396/EC "Gas appliances"). They also carry the "HR+" label (Gas boilers) and "OPTIMAZ" label (Oil boilers).



## WARNINGS

### IF YOU SMELL GAS:

- Immediately isolate the gas supply.
- Open windows and doors to ventilate the area.
- Do not use any electrical appliances and do not operate any switches.
- Immediately notify your gas supplier and/or your installer.

This documentation is part of the information delivered with the appliance and must be given to the user and stored in a safe place!

An approved installer must carry out the assembly, commissioning, maintenance and repair of the system, in accordance with current standards in force.

ACV shall not accept any responsibility for damage caused by non-compliant location of the system or by use of the parts or connections not approved by ACV for this application.



The manufacturer reserves the right to change the technical characteristics and specification of its products without notice.



The availability of some versions and their accessories is market dependant.

# DESCRIPTION

## OPERATING PRINCIPLE

The **HeatMaster**<sup>®</sup> is a high performance, direct fired hot water storage heater, which has indirect heat transfer due to its Tank-in-Tank construction.

At the heart of the **HeatMaster**<sup>®</sup> is a stainless steel cylinder through which the flue tubes pass. This is surrounded by a mild steel shell containing the primary water (neutral fluid). The outer shell extends down to the combustion chamber and even around the flue tubes. The area of the heat transfer surface is therefore much greater than that of standard direct fired water heaters.

A circulating pump fitted to the primary circuit moves the water around the tank, heating it faster and maintaining an even temperature across the primary jacket.

The burner, either gas or oil, fires onto the primary water which indirectly heats the stainless steel cylinder containing the DHW. As with all Tank-in-Tanks, this is corrugated over its full height and suspended in the **HeatMaster**<sup>®</sup> by its hot and cold water connections.

The cylinder expands and contracts during use and this, together with the fact that cold water does not come into contact with the intense heat of the burner flame, means that limescale buildup is prevented.

This scale resistant feature, along with the corrosion resistance of stainless steel, eliminates the need for sacrificial anodes.

The **HeatMaster**<sup>®</sup> has one very major advantage over other direct fired water heaters - because it heats the DHW with a primary circuit, this primary water can be used to provide central heating as well.

By connecting two, three, four or more **HeatMaster**<sup>®</sup> together in a module, most hot water and heating demands can be met.

Indeed, when used in conjunction with HR and Jumbo hot water storage tanks the **HeatMaster**<sup>®</sup> can supply even the largest hot water requirement.

## Standard equipment

The **HeatMaster**<sup>®</sup> 60 N, 70 N and 100 N has the following items as standard :

- ON/OFF switch
- Summer/Winter switch
- Timeclock
- Primary circulating shunt pump
- Primary expansion vessels
- Primary safety valve
- Pressure and temperature gauge
- Drain valve
- Body completely insulated in rigid polyurethane foam

## CONSTRUCTION FEATURES

### Outer body

The outer body containing the primary fluid is made of thick STW 22 steel.

### Tank-in-Tank heat exchanger

The ring-shaped inner tank with its large heating surface for producing domestic hot water is built of Chrome/Nickel 18/10 stainless steel. It is corrugated over its full height by an exclusive production process and entirely argon arc welded by the TIG (Tungsten Inert Gas) method.

### Combustion gases within the boiler

The combustion gas circuit is paint-protected and comprises:

#### • Flueways

Depending on output, **HeatMaster**<sup>®</sup> models contain several steel flueways with an internal diameter of 64 mm. Each flueway is fitted with a baffle of special steel designed to improve heat exchange and reduce flue gas temperatures.

#### • Combustion chamber

The combustion chamber on **HeatMaster**<sup>®</sup> models is entirely water cooled.

### Insulation

The boiler body is fully insulated by rigid polyurethane foam with a high thermal insulation coefficient, sprayed on without the use of CFCs.

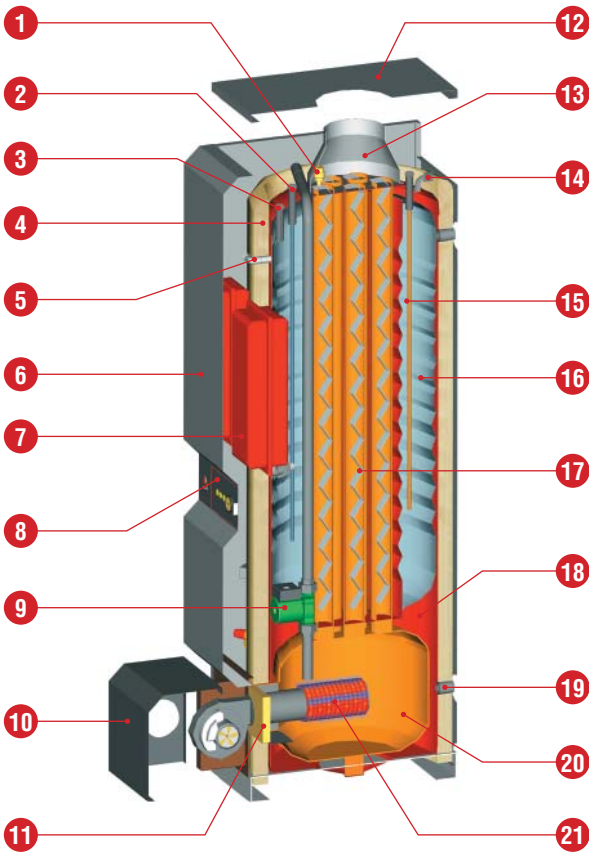
### Casing

The boiler is covered by a steel jacket which has been scoured and phosphated before being stove enamelled at 220 °C.

### Burner

All **HeatMaster**<sup>®</sup> models can be fitted with pressure jet gas burners or oil burners. The **HeatMaster**<sup>®</sup> 60, 70 and 100 can also be fitted with the low-NOx pre-mix BG 2000 gas burner.

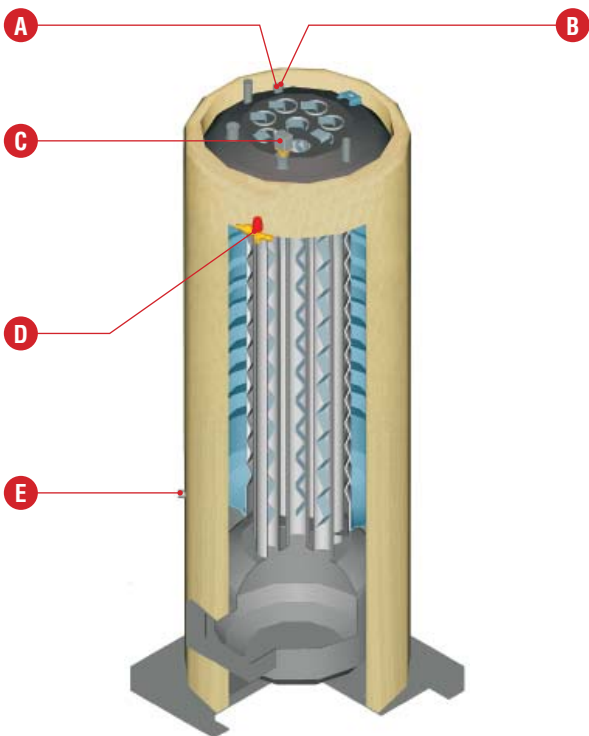
# DESCRIPTION



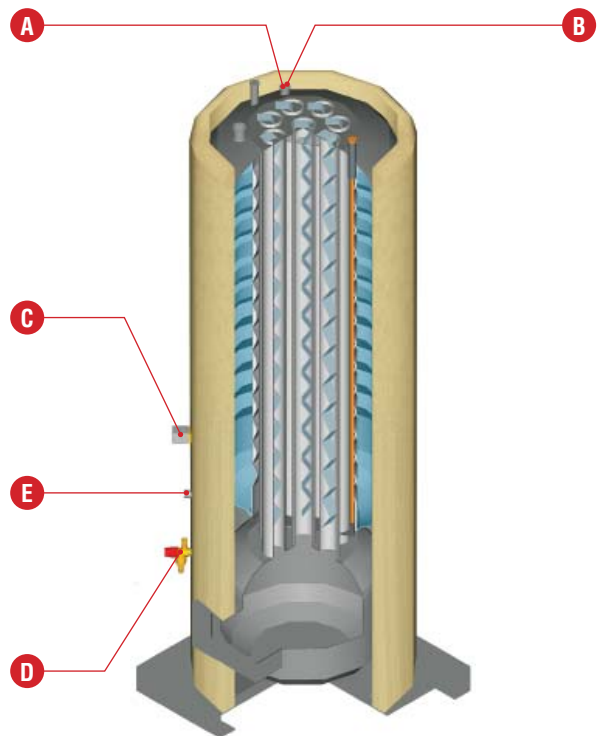
1. Automatic air vent
2. Domestic cold water inlet
3. Brass pocket
4. Polyurethane foam insulation
5. Heating circuit filling valve with removable hose and non-return valve
6. Casing front panel
7. Primary expansion vessel
8. Control panel
9. Boiler shunt pump
10. Burner cover
11. Burner chamber plate insulation
12. Top casing
13. Flue reduction collar
14. Heating flow
15. Domestic hot water outlet
16. Stainless steel Tank-in-Tank hot water store
17. Flue pipes and turbulators
18. Primary heating circuit
19. Heating return
20. Combustion chamber
21. Burner

- A. Thermal reset high limit thermostat
- B. Manual reset high limit thermostat
- C. Low water pressure switch
- D. Primary safety valve
- E. Control thermostat

Safety features of the **HeatMaster® 60 N**



Safety features of the **HeatMaster® 70 N and 100 N**



## USING THE BOILER



Your system should be serviced at least once a year by a qualified engineer.  
If the boiler is subject to heavy use, it may require servicing more than once a year - consult your service engineer for advice.

### Starting the burner:

In normal operation, the burner starts automatically whenever the boiler temperature falls below the set temperature.

## Understanding the control panel

There are no user parts inside the control panel.

### • ON/OFF switch

This turns the **HeatMaster®** on or off.

### • Control thermostat - 60 to 90 °C

When using the **HeatMaster®** as a hot water generator only, the temperature can be set between 60 °C and 90 °C.

If the **HeatMaster®** is used for both hot water and central heating, the control thermostat would normally be set at 80 °C to achieve optimum operating conditions.

### • Summer/Winter switch

This turns the heating pump (if fitted) on or off.

### • Manual reset high limit thermostat

If the boiler temperature exceeds 103 °C this safety device will activate and the high temperature indicator will light up. To reset - first allow the boiler to cool to below 60 °C, unscrew the cap and press the reset button using a pencil or similar pointed device, replace the cap. If the fault persists, turn the boiler off and call an engineer.

### • Time clock

This allows the **HeatMaster®** to be timed on and off and operates on a 24 hour sequence. Around the outside of the clock there are a number of white tabs, these allow 15 minute switching periods. To set the time clock simply push outwards the number of tabs required for ON period.

Remember: TAB IN = **HeatMaster®** OFF  
TAB OUT = **HeatMaster®** ON

### • Temperature and pressure gauge

This gauge indicates both the temperature of the **HeatMaster®** and the pressure within the primary circuit.

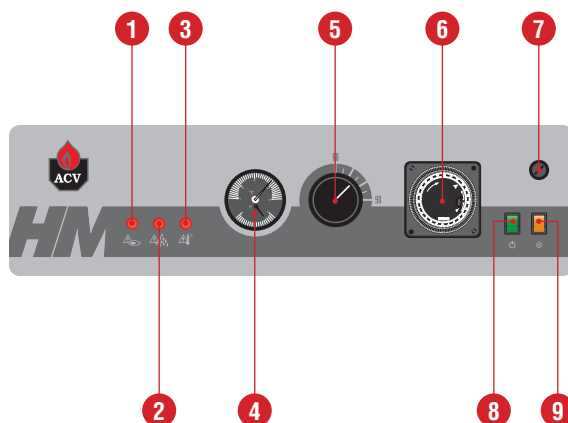
The temperature should not exceed 90 °C - if it does, switch the boiler off and check the thermostat setting. If the fault persists, call an engineer.

The pressure should not fall below 1 bar, if it does the please see the 'Heating System Pressure' paragraph later in this section.

### • Low primary water pressure indicator

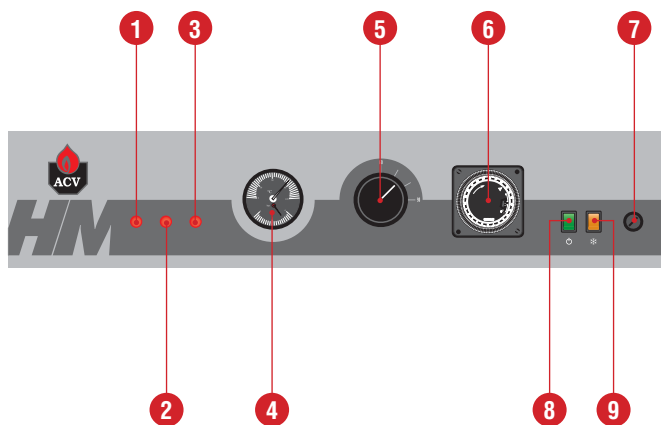
If this indicator lights up, the primary circuit of the **HeatMaster®** requires topping up with water. Please see the 'Heating System Pressure' paragraph later in this section.

Control panel **HeatMaster®** 60 N



1. Burner lockout indicator
2. Primary circuit low water pressure indicator
3. High limit cutoff indicator
4. Combined temperature and pressure gauge
5. Control thermostat
6. Time clock
7. Manual reset high limit thermostat
8. ON / OFF switch
9. Summer / Winter switch

Control panel **HeatMaster®** 70 N and 100 N



## Heating system pressure



From time to time you may need to top up the heating system pressure. This pressure is indicated by the combined temperature and pressure gauge on the boiler control panel.

The minimum pressure when the boiler is cold should be 1 bar. The precise operating pressure required depends on the height of the building, and your installer will have informed you of this value at the time of installation (see Commissioning Section - Filling the hot water and heating circuits).

If the pressure falls below 1 bar, the boiler water pressure switch will turn the boiler off until pressure is restored.

To re-pressurise, the system needs to be topped up with water.

First, switch the boiler OFF on the ON / OFF switch and isolate the external electrical supply. Then remove the casing top front panel by pulling it forward. The filling valves "A" and "B" can now be seen. Open both valves and allow the system to fill. When the combined temperature and pressure gauge shows the required pressure, close both valves. Replace the casing top front panel. Restore the power supply and switch the boiler on.

## RESETTING THE PRESSURE JET OIL OR GAS BURNER

- **HeatMaster® 60 N / 70 N and 100 N**  
 ➔ the lockout indicator is situated on the burner and on the control panel.

The red warning light indicates an operating fault. Wait five minutes before resetting the burner. To reset : press the button located on the burner.

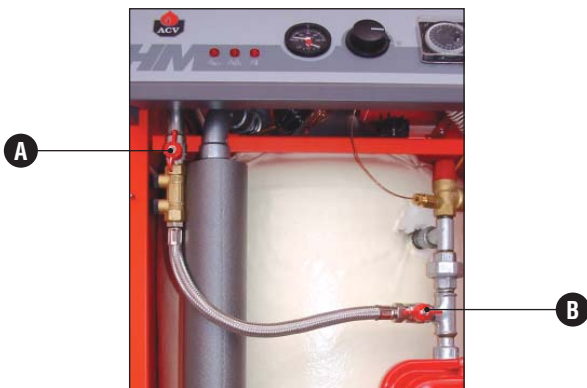
If the burner does not relight, call the service engineer after ensuring that the fault is not due to a power cut or low oil in the tank.



## Safety Valves

If water discharges from any of the safety valves, switch the boiler off and call a service engineer.

HeatMaster® 60 N



HeatMaster® 70 N and 100 N



## RESETTING THE BG 2000-S PREMIX GAS BURNER

- **HeatMaster® 60 N with BG 2000-S/60**  
**HeatMaster® 70 N with BG 2000-S/70**  
**HeatMaster® 100 N with BG 2000-S/100**  
 ➔ the lockout indicator is situated on the burner and on the control panel.

1. Remove the burner cover.
2. Press the red button to restart the burner.
3. If the burner lights, replace the cover.
4. If the fault persists, call a service engineer.



## BURNER TROUBLESHOOTING

For all burners - please refer to the relevant servicing and troubleshooting instructions in your burner's technical manual.

# TECHNICAL CHARACTERISTICS

## MAXIMUM OPERATING CONDITIONS

### Maximum service pressure (tank full of water)

- Primary circuit: 3 bar
- Secondary circuit: 10 bar

### Test pressure (tank full of water)

- Primary circuit: 4.5 bar
- Secondary circuit: 13 bar

### Operating temperature

- Maximum temperature: 90 °C

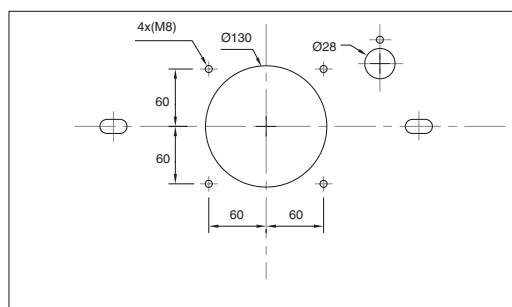
### Water quality

- Chlorures: < 150 mg/l (304)  
< 2000 mg/l (Duplex)

- $6 \leq \text{ph} \leq 8$

## BURNER CHAMBER PLATE

The burner chamber plate has 4 threads M8 for attaching the burner. It is protected from heat by a blanket insulation.



## GENERAL FEATURES

		HeatMaster® 60 N	HeatMaster® 70 N	HeatMaster® 100 N
Maximum Input	kW	69,9	69,9	107,0
Maximum Output	kW	62,9	62,9	96,3
Maintenance loss at 60°C as rated value	%	0,57	0,60	0,65
Total capacity	L	162	239	330
Primary circuit capacity	L	82	108	130
Heating connection [F]	Ø	1"1/2	1"1/2	1"1/2
Domestic hot water connection [M]	Ø	3/4"	1"	1"
Domestic hot water tank heat exchanger surface	m²	2,46	3,14	3,95
Pressure drop primary circuit	mbar	54	46	83
Pressure drop in the combustion chamber	mbar	0,6	0,6	1,4

## DOMESTIC HOT WATER FEATURES


Operating conditions at 80°C		HeatMaster® 60 N	HeatMaster® 70 N	HeatMaster® 100 N
Peak flow at 40°C [ΔT = 30°C]	L/10'	474	646	905
Peak flow at 45°C [ΔT = 35°C]	L/10'	378	543	777
Peak flow at 60°C [ΔT = 50°C]	L/10'	245	346	514
Peak flow at 70°C [ΔT = 60°C]	L/10'	193	268	343
Peak flow at 80°C [ΔT = 70°C]	L/10'	135	207	258
Peak flow at 40°C [ΔT = 30°C]	L/60'	1942	2133	3172
Peak flow at 45°C [ΔT = 35°C]	L/60'	1656	1794	2680
Peak flow at 60°C [ΔT = 50°C]	L/60'	1106	1219	1813
Peak flow at 70°C [ΔT = 60°C]	L/60'	681	971	1226
Peak flow at 80°C [ΔT = 70°C]	L/60'	499	636	893
Constant flow at 40°C [ΔT = 30°C]	L/h	1835	1835	2776
Constant flow at 45°C [ΔT = 35°C]	L/h	1573	1573	2379
Constant flow at 60°C [ΔT = 50°C]	L/h	1101	1067	1665
Constant flow at 70°C [ΔT = 60°C]	L/h	791	918	1104
Constant flow at 80°C [ΔT = 70°C]	L/h	455	580	804
Pre-heat time	minutes	9	16	13

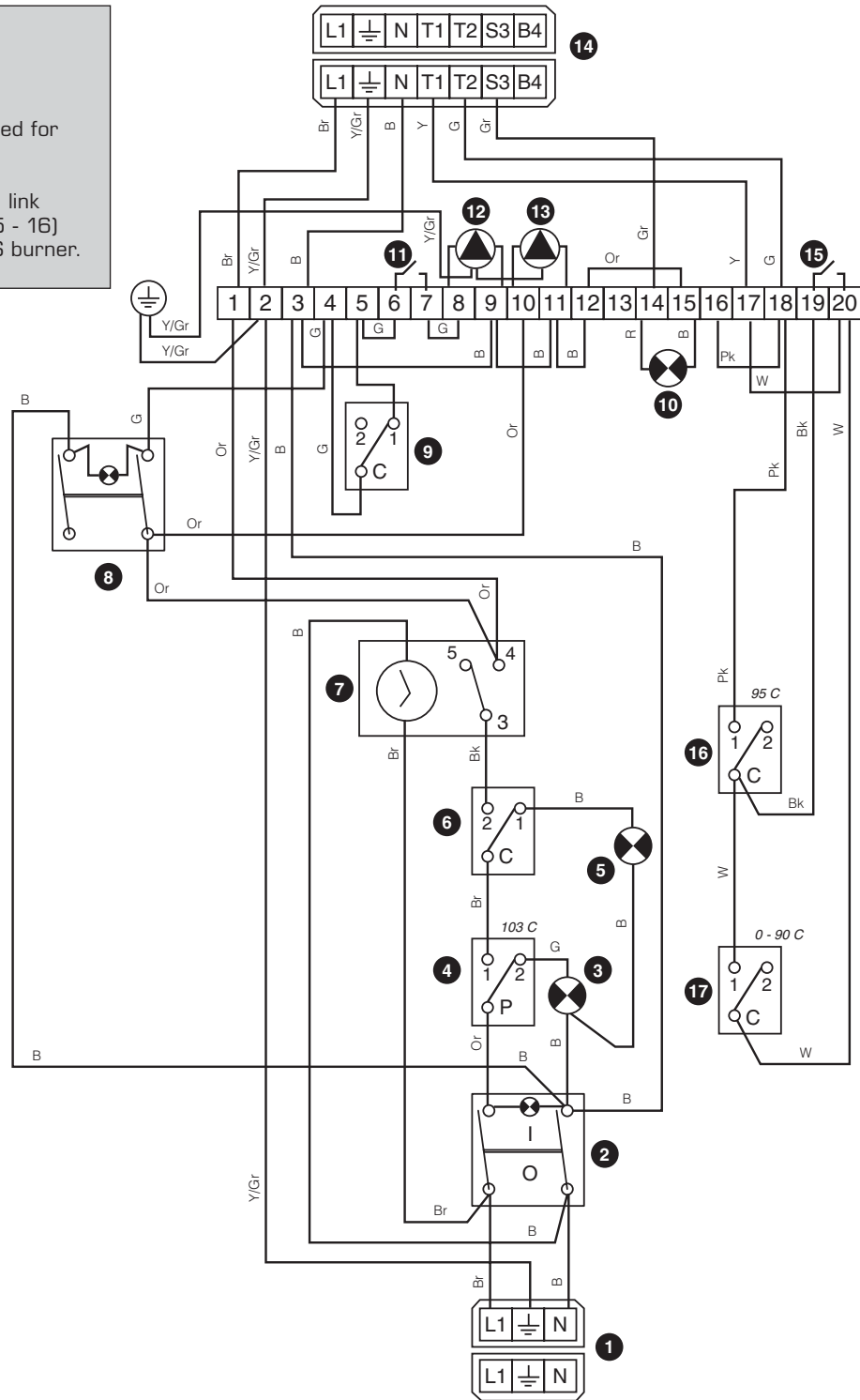


# WIRING DIAGRAM : HeatMaster® 60 / 70 / 100



- |   |  |
|---|--|
| 1. 230 V power connection plug                  | 10. Burner lockout indicator                 |
| 2. ON/OFF switch                                | 11. Room thermostat (optional)               |
| 3. Temperature high limit cutoff indicator      | 12. Central heating pump                     |
| 4. Manual reset high limit thermostat           | 13. HeatMaster® loading pump                 |
| 5. Primary circuit low water pressure indicator | 14. Burner plug connector                    |
| 6. Low water pressure switch                    | 15. Water flow switch connection (optional)  |
| 7. Time clock                                   | 16. Thermal reset high limit thermostat 95°C |
| 8. Summer / Winter switch                       | 17. Control thermostat                       |
| 9. Hot water priority link                      |  |

  
The wiring shown is designed for blown gas or oil burners.  
It is important to move the link from points (12 - 15) to (15 - 16) when using the BG 2000-S burner.



- B. Blue
- Bk. Black
- Br. Brown
- G. Grey
- Gr. Green
- Or. Orange
- Pk. Pink
- R. Red
- V. Violet
- W. White
- Y. Yellow
- Y/Gr. Yellow / Green

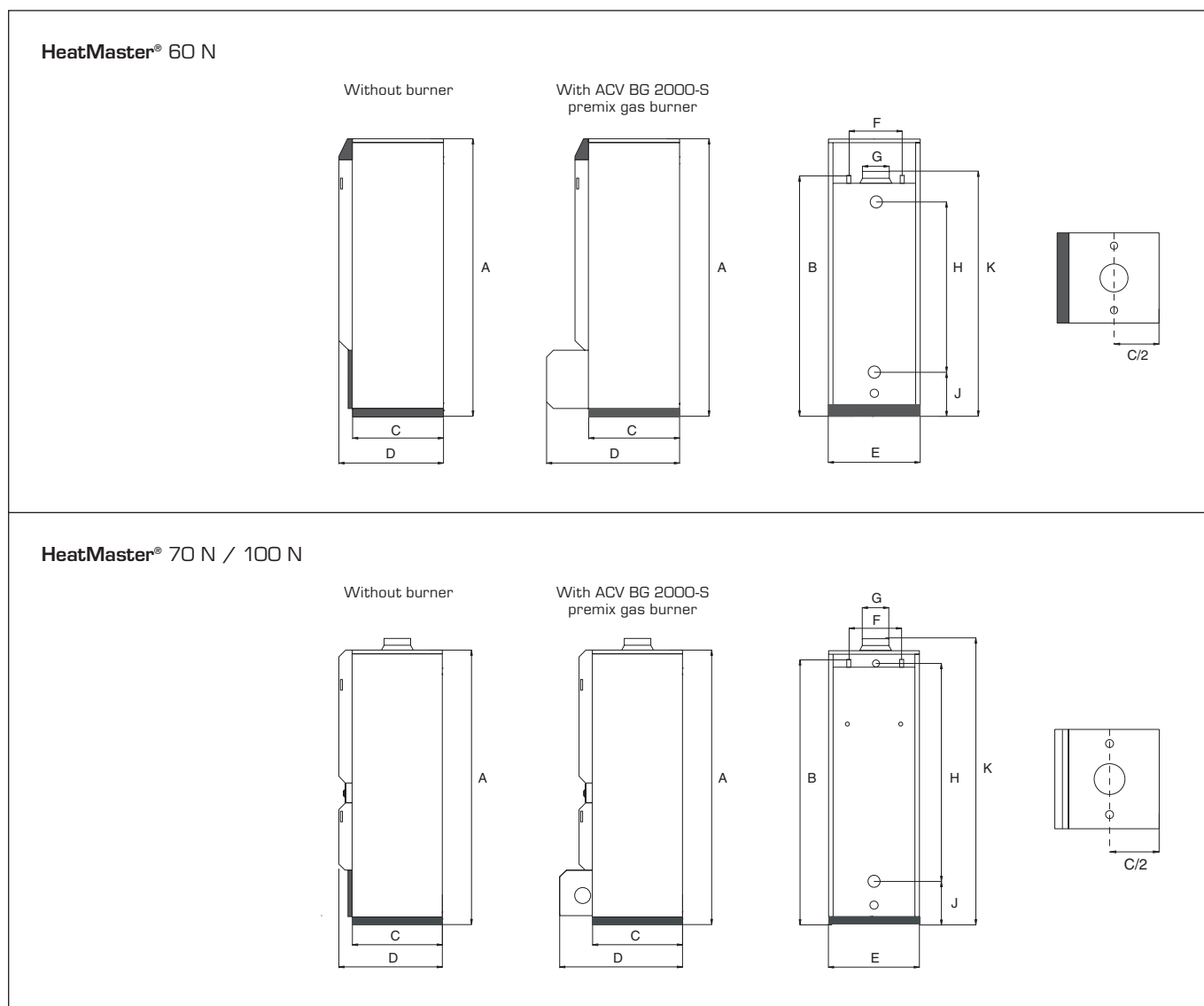
# INSTALLATION

## DIMENSIONS

The units are delivered fully assembled, tested and packed on a timber base with shockproof edges and protected by heat-shrunk plastic film.

On reception and after unpacking, check the equipment for damage. For transport purposes, refer to the weight and dimensions given below.

	HeatMaster® 60 N	HeatMaster® 60 N + BG 2000-S/60	HeatMaster® 70 N	HeatMaster® 70 N + BG 2000-S/70	HeatMaster® 100 N	HeatMaster® 100 N + BG 2000-S/100
A mm	1698	1698	1743	1743	2093	2093
B mm	1583	1583	1630	1630	2030	2030
C mm	540	540	678	678	678	678
D mm	625	801	797	937	797	937
E mm	540	540	680	680	680	680
F mm	390	390	390	390	390	390
G mm	150	150	150	150	150	150
H mm	1098	1098	1289	1289	1693	1693
J mm	281	281	285	285	285	285
K mm	1665	1665	1720	1720	2120	2120
Weight empty [kg]	220	232	270	282	320	333



# INSTALLATION

## BOILER ROOM

- Make sure that all air vents are unobstructed at all times.
- Do not store any flammable products in the boiler room.
- Do not store any corrosive products, paint, solvents, salts, chlorine products and other detergent products near the appliance.
- If you smell gas, do not switch ON or OFF any lights, turn off the gas tap at the meter, ventilate the rooms and contact your installer.
- The base on which the boiler rests must be made of non-combustible materials

## ACCESSIBILITY

The appliance must be positioned in such a way to be accessible any time. In addition, the following minimum distances are required around the appliance.

- Front **500 mm**
- Side **100 mm**
- Behind **150 mm**
- Above **700 mm**

## CONNECTION TO THE CHIMNEY

- The chimney connections must comply with the applicable standards (in Belgium: NBN D51-003), it must be installed by an approved engineer, in accordance with the prevailing local standards and regulations.
- Flue size should not be less than the outlet size of the boiler.

### Chimney connection type B23P

The Boiler is connected to the chimney by metal pipe rising at an angle from the boiler to the chimney. **A flue disconnection piece is required.** This must be easy to remove to give access to the flue pipes when servicing the boiler.

Due to the high efficiency of our boilers, the flue gasses exit at low temperature. Accordingly, there is risk that the flue gasses could condense, which could damage the chimney and the boiler. In order to avoid this risk, it is strongly recommended that the chimney be lined and a condensate trap is fitted.

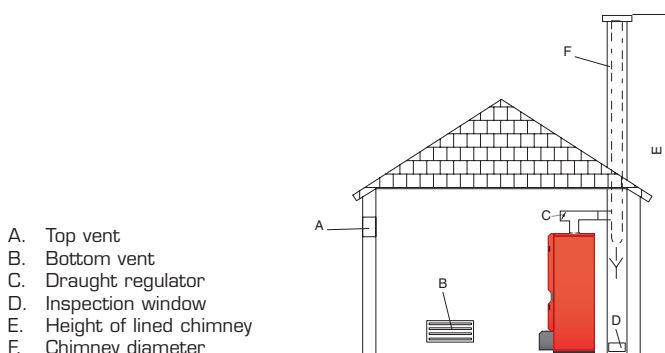
Ventilation		HM 60 N	HM 70 N	HM 100 N
Min. fresh air requirement	m <sup>3</sup> /h	126	126	194
Bottom	dm <sup>2</sup>	2,11	2,11	3,20
Top	dm <sup>2</sup>	2,0	2,0	2,0

### Chimney minimum flue Ø

E = 5 m Ø F min.	mm	189	189	234
F = 10 m Ø F min.	mm	159	159	178
E = 15 m Ø F min.	mm	150	150	150



**Note :**  
Regulations vary from the country therefore the table above is intended only as a guide.



### Balanced flue boiler connection type

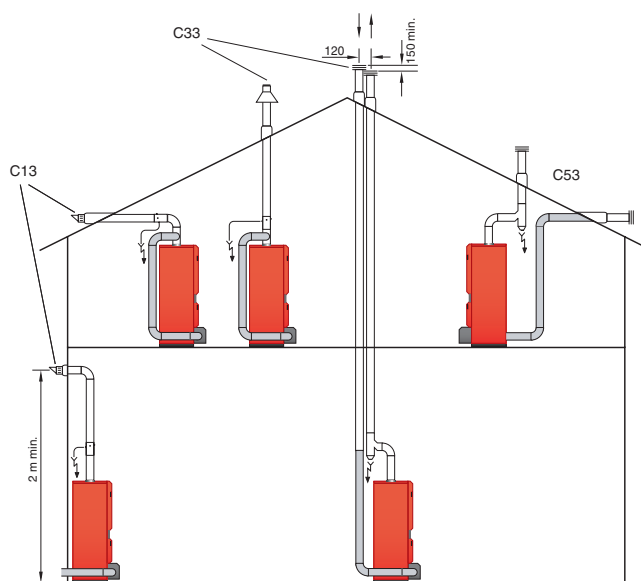
#### C13 - C33 - C53 - C63

- C13 : Concentric horizontal connection
- C33 : Concentric vertical connection
- C53 : Parallel chimney connection
- C63 : Concentric vertical connection without terminal (Only in Germany and Luxemburg).

The maximum flue resistance is **100 Pascal** - the table below can be used to calculate this value.

	HeatMaster® 60N / 70N		HeatMaster® 100 N	
	Air 80 mm	Flue gas 150mm	Air 100 mm	Flue gas 150mm
1 m straight pipe	6	1	6	2
90° pipe bende	15	2	15	5
45° pipe bende	6	1	6	2
Condensate recovery	-	2	-	4
Outlet pipe	20	10	20	20

*This table is based on the equipment offered by ACV and cannot be applied generally.*



*The maximum length of concentric flue is 6 meters.*



A condensation drain outlet must be fitted close to the boiler to prevent condensation products from the chimney running into the boiler.

To avoid condensation water running out of the terminal, all horizontal flue runs must fall back towards the boiler.

# INSTALLATION

## DOMESTIC HOT WATER CONNECTION



Before pressurizing the central heating circuit (primary) you should first pressurize the domestic hot water tank (secondary).

The HeatMaster® boiler can be connected directly on the domestic hot water circuit.

Flush out the system before connecting the domestic hot water part.

The installation must be fitted with an approved safety unit with a 7-bar safety valve, a non-return valve and a shut-off valve.

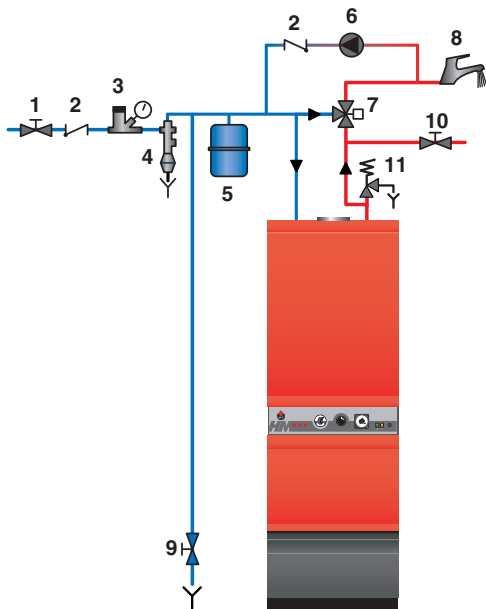
During the heating process, the domestic hot water dilates and the pressure increases. As soon as the pressure exceeds the safety valve setting, the valve opens and discharges a small quantity of water. Using a hot water expansion vessel (2 liters at least) will prevent this phenomenon and reduce water hammer effect.



The hot water output temperature may reach temperatures in excess of 60°C, which can cause burns. We therefore recommend that you install a thermostatic mixer immediately after the appliance outlet.



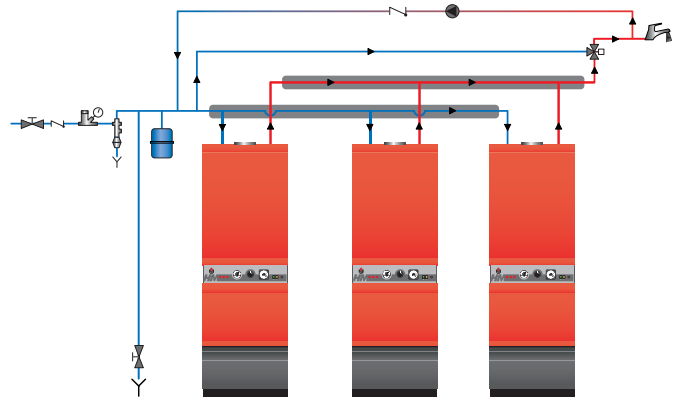
If stop valves are used in the domestic hot water system, they can cause pressure waves when closed. Use devices designed to reduce water hammer to avoid this phenomenon.



1. Cold water supply tap
2. Non-return valve
3. Pressure reducing valve
4. Safety group
5. Hot water expansion vessel
6. Hot water secondary pump (if fitted)
7. Thermostatic mixing valve
8. Drawoff tap
9. Drain cock
10. Stop cock for cleaning
11. Temperature relief valve (UK-only)

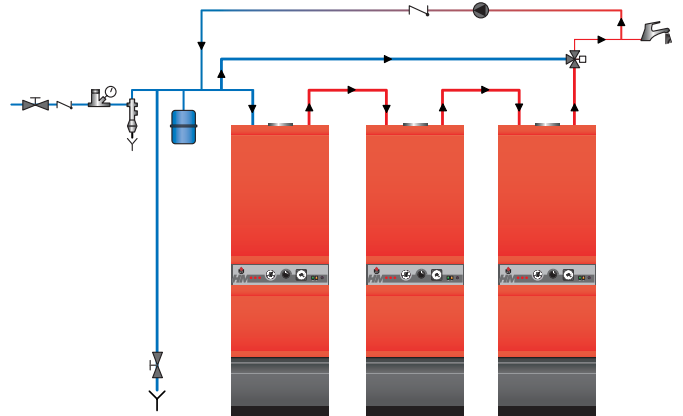
## Example of parallel connection

Recommended for applications with a high continuous flow.



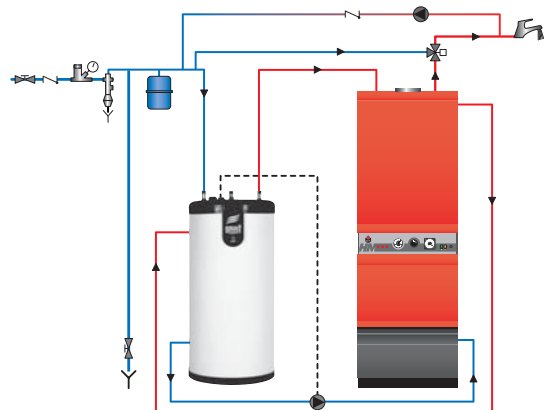
## Example of series connection

Preferable for high temperature applications with up to three units.



## Example of heating + storage connection

Recommended for applications requiring a high peak flow.



## HEATING CONNECTION



Before pressurizing the central heating circuit (primary) you should first pressurize the domestic hot water tank (secondary).

The HeatMaster® has two connections at the rear that can be used to connect a central heating circuit. Connecting a heating system may reduce the domestic hot water performance.

### Expansion

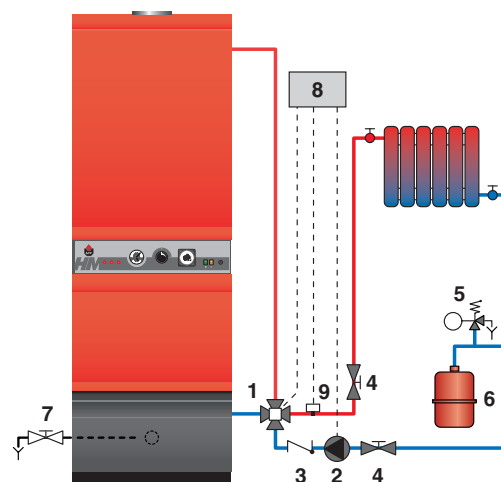
The HeatMaster® 60 is fitted with an 8 litre expansion vessel. HeatMaster® 70/100 models are fitted with two 10 litre expansion vessels. These expansion vessels are sized for hot water operation only. If a heating system is connected to the primary circuit, calculate the expansion capacity necessary for the total volume of the heating system. *(Refer to the technical instructions from a relevant manufacturer of expansion vessels).*



### WARNING

The primary safety valve is supplied with a plastic tube connected to the discharge outlet - this is for test purposes only and should be removed. The safety valve should be connected to a drain using a metallic pipe eg. copper.

1. 4-way valve
2. Heating pump
3. Non-return valve
4. Isolating valves
5. Safety valve set to 3 bar with pressure gauge
6. Expansion vessel
7. Drain cock
8. Controller
9. Contact sensor

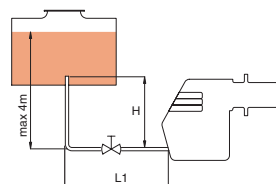


## OIL SUPPLY CONNECTIONS - ACV BM BURNERS

*(if another make of burner is fitted please refer to that manufacturers technical manual)*

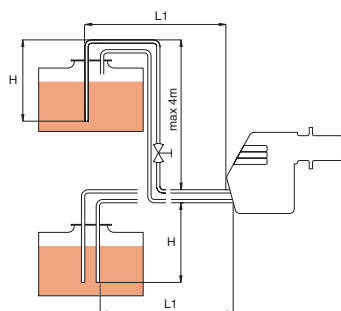
### Installation without return

H (m)	L (m) (L = H + 1)	
	Ø int. 8 mm	Ø int. 8 mm
0,5	10	20
1	20	40
1,5	40	80
2	60	100



### Installation with return

H (m)	L (m) (L = H + 1)	
	Ø int. 8 mm	Ø int. 8 mm
0	35	100
0,5	30	100
1	25	100
1,5	20	90
2	15	70
2,5	8	30
3,5	6	20



## CONNECTION TO THE GAS

- The HeatMaster® is fitted with a Ø 3/4" (BG 2000-S/60, BG 2000-S/70) and Ø 1" (BG 2000-S/100) female fitting connector, on which you can connect the gas tap.
- The gas connection must comply with the applicable regulations (e.g. NBN D51-003 in Belgium) in the country of installation.
- Where there is a risk of dirt stemming from the network, place a gas filter upstream from the connection.
- Fill the gas line the gas pipe and check in minute detail that all the boiler pipes, both inside and outside, are sealed.
- Check the gas pressure in the system. Consult the technical characteristics.
- Check the gas pressure and consumption when commissioning the appliance.

# COMMISSIONING

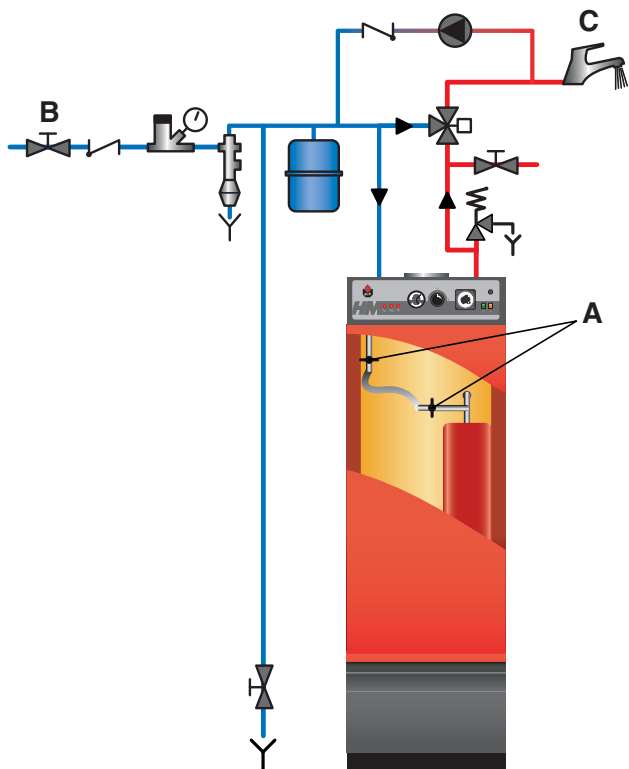
## FILLING THE DOMESTIC HOT WATER AND HEATING CIRCUITS



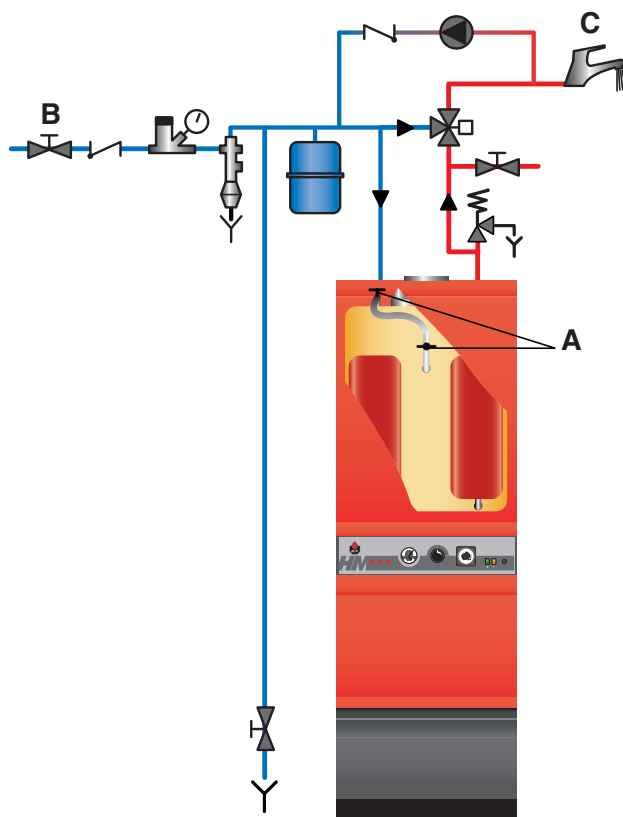
Before pressurizing the central heating circuit you should first pressurize the domestic hot water tank. Both the domestic hot water tank and the central heating circuit must be filled before using the boiler.

1. Close the primary circuit filling valves **(A)**
2. Open the stop valve **(B)** and the drawoff tap **(C)**.  
When water flows out of the tap, the hot water tank is full and the drawoff tap **(C)** should be closed.
3. Fill the primary (heating) circuit by opening the valves **(A)** and pressurising to 1 bar.
4. Open the automatic air vent located on top of the boiler.  
**IMPORTANT - the screw cap must be left loose to allow future automatic venting to take place.**
5. After venting the air from the system, bring the pressure up to the static head plus 0.5 bar:  
**1.5 bar = 10m and 2 bar = 15 m.**
6. Check that the electrical connection and boiler room ventilation conform to the relevant standards.
7. Set the thermostat between 60 and 90 °C.
8. Switch the on/off switch to the ON position.
9. For gas burner, check the gas supply pressure on starting up.
10. For the oil burner, check the oil supply (and return). Proceed with the necessary venting, measurements and settings.
11. Set the heating control to heat demand. When the burner operates, check the flue gas discharge pipes for leaks.
12. After 5 minutes of operation, vent the primary circuit again maintaining the water pressure at 1 bar.
13. Then restart the unit and check the combustion.

HeatMaster® 60 N



HeatMaster® 70 N and 100 N



# BURNER FEATURES

## ACV BG 2000-S PREMIX GAS BURNERS

### Description

The burner tube is coated with metal fibre (NIT) which, in addition to its remarkable heat exchange capabilities, gives greater durability.

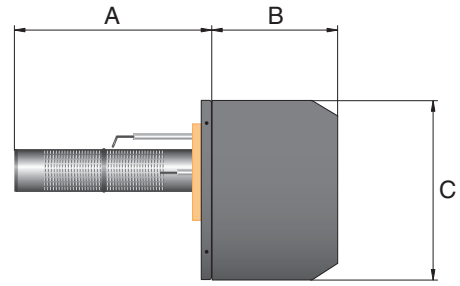
The principle components of the burner are:

- a fan with adjustable speed
- an automatic ignition and flame detection system
- a gas valve and venturi specially developed for air/gas pre-mix burners with low NOx

The pressure at the gas valve outlet is equal to the air pressure at the neck of the venturi tube, reduced as the offset is adjusted. The fan sucks in the combustion air through the venturi tube which the gas inlet leads into. As it goes through, the air creates a vacuum to the right of the neck of the venturi tube and sucks in the gas at the venturi tube outlet. A perfect air/gas mix then goes through the fan and then goes on towards the burner tube.

### *This design ensures very quiet and safe operation:*

- If there is an air blockage, the pressure differential in the venturi falls, the gas flow diminishes, the flame goes out and the gas valve closes: the burner is in safety shutdown mode.
- If there is a blockage in the chimney outlet, the air flow diminishes, and the same reactions as those described above cause the burner to shut down in safety mode.
- The BG 2000-S burner fitted to the **HeatMaster®** 60, 70 and 100 is controlled by a Honeywell module which controls burner operation and safety.



TYPE	A	B	C
BG 2000-S / 60	375	228	272
BG 2000-S / 70	375	248	342
BG 2000-S / 100	375	248	342



BG 2000-S burners are preset at factory for natural gas

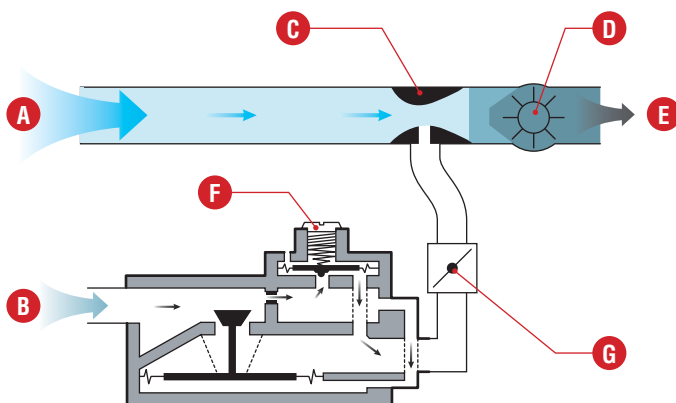
### Conversion to propane



**Not applicable for Belgium.**

Conversion kit included with burner comprising :  
 - Restrictor(s)  
 - Nameplate(s)  
 - Sticker with settings  
 - Fitting instructions

Air-gas mixture control system



- A. Air inlet
- B. Gas inlet
- C. Venturi
- D. Fan
- E. Air - Gas mixture
- F. Offset regulation screw
- G. Gas flow regulation screw

# BURNER FEATURES

		HeatMaster® 60 N + BG 2000-S / 60	HeatMaster® 70 N + BG 2000-S / 70	HeatMaster® 100 N + BG 2000-S / 100
Input	kW	69,9	69,9	107,0
Output	kW	62,9	62,9	96,3
Combustion efficiency - natural gas	%	91,2	91,5	92,1
Natural gas CO <sub>2</sub>	%	9,5	9,0	9,5
Pressure drop combustion chamber	mbar	0,6	0,6	1,4
Flue gas temperature	°C	186	172	165
Mass flow rate of combustion products	g/sec.	32,1	32,1	49,2
G20 gas flow rate - 20 mbar	m <sup>3</sup> /h	7,40	7,40	11,32
G25 gas flow rate - 25 mbar	m <sup>3</sup> /h	8,60	8,60	13,17
G31 gas flow rate - 30/37/50 mbar	m <sup>3</sup> /h	2,86	2,86	4,50

## Gas categories HeatMaster® N + BG 2000-S

	I2E(S)B I2E(R)B *	I12H3B/P	I12H3P	I12E3B/P	I12Er3P	I12L3B/P	I12L3P	I3P
<b>G20</b>	20 mbar	20 mbar	20 mbar	20 mbar	20 mbar			
<b>G25</b>	25 mbar				25 mbar	25 mbar	25 mbar	
<b>G30</b>		30 - 50 mbar		30 - 50 mbar		30 - 50 mbar		
<b>G31</b>		30 - 50 mbar	37 - 50 mbar	30 - 50 mbar	37 - 50 mbar	30 - 50 mbar	37 - 50 mbar	37 mbar
<b>BE</b> Belgium	●							●
<b>CH</b> Switzerland		●	●					
<b>CZ</b> Czech republic		●	●					
<b>DE</b> Germany				●				
<b>DK</b> Denmark		●						
<b>EE</b> Estonia		●						
<b>ES</b> Spain			●					
<b>FR</b> France			●		●		●	
<b>GB</b> Great Britain			●					
<b>GR</b> Greece		●	●					
<b>IE</b> Ireland			●					
<b>IT</b> Italy		●	●					
<b>LU</b> Luxembourg				●				
<b>LT</b> Lithuania		●						
<b>NL</b> Netherlands						●	●	
<b>PL</b> Poland				●				
<b>PT</b> Portugal			●					
<b>SI</b> Slovenia		●	●					
<b>SK</b> Slovakia		●	●					
<b>SE</b> Sweden		●						

(\*) HeatMaster® 100 N + BG 2000-S/100

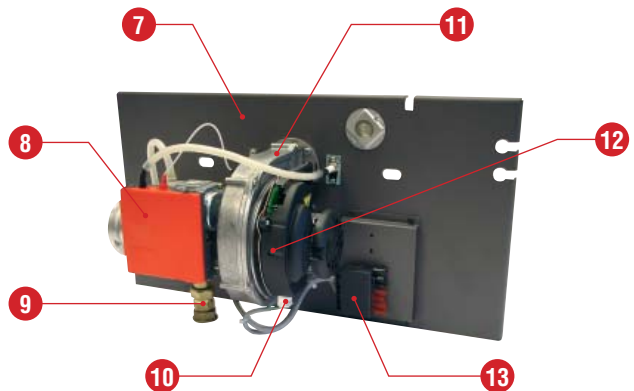
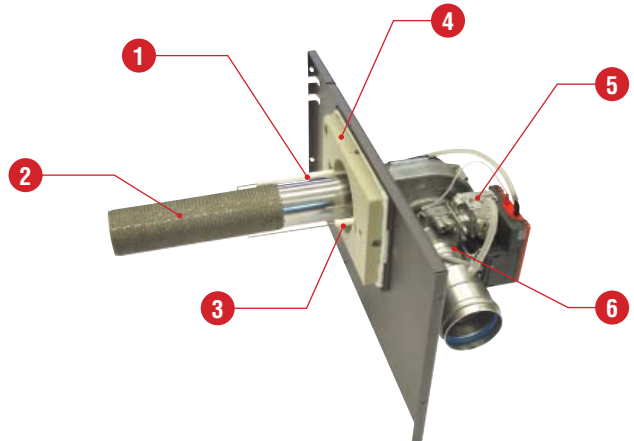
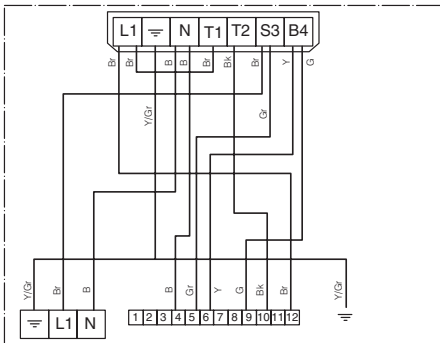


# BURNER FEATURES

## ACV Premix gas burner BG 2000-S/60 and BG 2000-S/70

1. Ignition electrode
2. Burner tube
3. Ionisation probe
4. Burner chamber plate insulation
5. Gas valve
6. Venturi
7. Chamber plate
8. Relay
9. Gas inlet
10. Fan power plug
11. Fan
12. Potentiometer setting
13. Burner plug connector

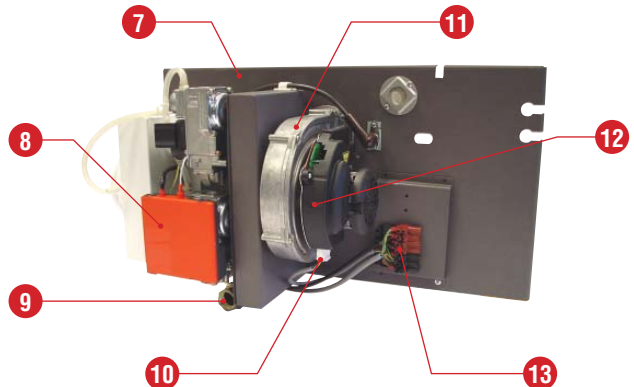
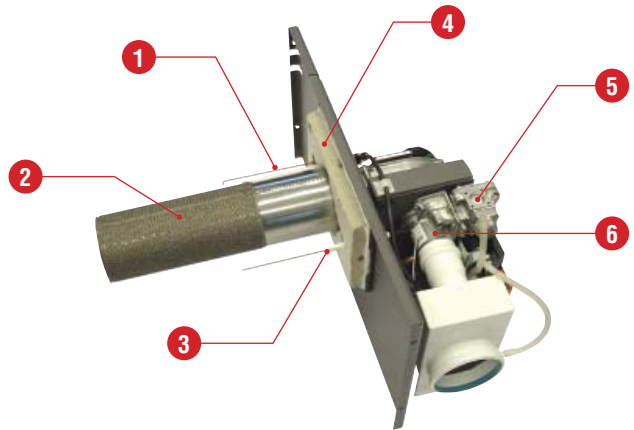
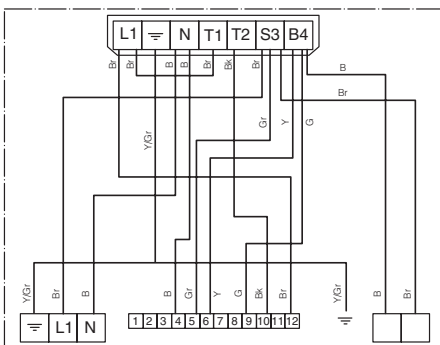
- B. Blue  
 Bk. Black  
 Br. Brown  
 G. Grey  
 Gr. Green  
 Y. Yellow  
 Y/Gr. Yellow / Green



## ACV Premix gas burner BG 2000-S/100

1. Ignition electrode
2. Burner tube
3. Ionisation probe
4. Burner chamber plate insulation
5. Gas valve
6. Venturi
7. Chamber plate
8. Relay
9. Gas inlet
10. Fan power plug
11. Fan
12. Potentiometer setting
13. Burner plug connector

- B. Blue  
 Bk. Black  
 Br. Brown  
 G. Grey  
 Gr. Green  
 Y. Yellow  
 Y/Gr. Yellow / Green



# BURNER FEATURES

## ACV BM 102 AND BM 152 OIL BURNERS

### Description

The use of new technology enables our medium output burners to meet current performance and emissions quality requirements.

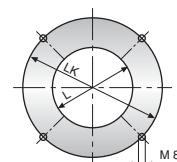
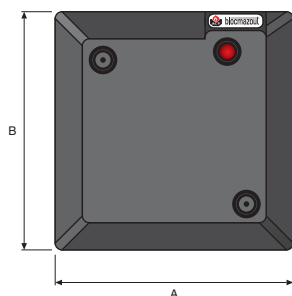
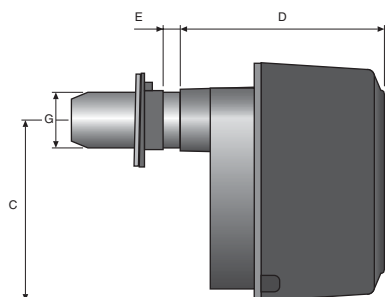
These burners are fitted with high quality components including a two-stage oil pump that permits soft start.

### Features

- Easy to install – fitted with safety closure and new burner suspension system.
- The burner air pressure adjusts to the pressure in the burner chamber.
- An automatic damper shuts off the air flow when the burner is turned off, preventing the boiler from cooling.
- Quiet and extremely reliable.
- Adjustable to the depth of the boiler burner chamber thanks to the adjustable bracket at the mouth of the burner chamber.
- Three air adjustment points to ensure the best air/oil mixture.
  - upstream air presetting
  - primary setting
  - combustion head setting

### BM oil burners dimensions

	A mm	B mm	C mm	D mm	E mm	F mm	G Ø	L Ø	LK Ø	Kg
BM 102	350	350	285	325	50	M 8	100 / 82	110	150	16
BM 152	350	350	285	325	50	M 8	100 / 123	110	150	16



### Oil burner specification and performances

		HeatMaster® 60 N	HeatMaster® 70 N	HeatMaster® 100 N
Burner type		BM 102	BM 102	BM 152
Input	<b>kW</b>	69,9	69,9	107,0
Nozzle flow	<b>US Gal/h</b>	1,50	1,50	2,00
Nozzle angle		60°	60°	60°
Oil flow	<b>kg/h</b>	5,9	9,9	8,9
Pump pressure	<b>bar</b>	10,5	10,5	13,5
Flue gas temperature	<b>°C</b>	175	170	170
CO <sub>2</sub>	<b>%</b>	12,5	12,5	12,5
Mass rate combustion products	<b>g/sec.</b>	29,6	29,6	44,8

## SERVICE INTERVALS

ACV recommends that boilers should be serviced at least once a year. The burner must be serviced and tested by a competent engineer. If a boiler is subject to heavy use, it may require servicing more than once a year - consult ACV for advice.

## SERVICE THE BOILER

1. Turn OFF the on/off switch on the boiler control panel and isolate external electrical supply.
2. Turn off the gas or oil supply to the boiler.
3. Remove the flue to gain access to the top of the boiler.
4. Remove the casing top panel and lift off the flue reduction collar by undoing the fastening bolts.
5. Remove the turbulators from the flue pipes for cleaning.
6. Unscrew the burner chamber plate and remove the burner.
7. Brush the flue pipes .
8. Clean the burner chamber and the burner.
9. Re-assemble turbulators, flue reduction collar and flue, checking that the gasket on the flue reduction collar is in good condition. Replace gasket if necessary.

## SERVICING THE SAFETY DEVICES

- Check that all thermostats and safety devices are working properly.
- Test the safety valves on the central heating and hot water circuits.

## SERVICING THE BURNER

### Oil burner

- Check and if necessary clean the main filter on the oil line.
- Check the alignment of the nozzle: check, clean or change the nozzle and its filter, check that the electrodes and flame holder are clean and correctly adjusted.
- Reassemble and check that the safety components are working properly.
- Set the combustion parameters.
- Check the combustion (CO<sub>2</sub>, CO and burner pressure)

### Gas burner

- Check that the insulation and gasket on the burner chamber plate are in good condition - replace if necessary.
- Check and clean the burner and electrodes. Replace electrodes if necessary (under normal use once a year).
- Check that the safety components are working properly.
- Check the combustion (CO<sub>2</sub>, CO and gas pressure)

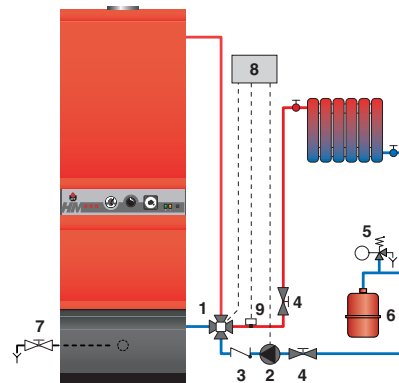
## DRAINING THE BOILER



Water flowing out of the drain cock may be extremely hot and could cause severe scalding.  
Keep people away from discharges of hot water.

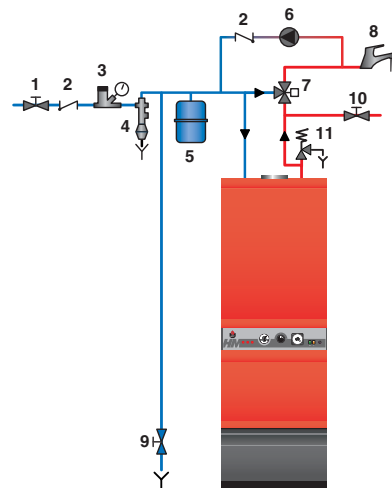
### Draining the heating circuit

1. Turn OFF the on/off switch on the boiler control panel, isolate external electrical supply, and turn off the gas or oil supply to the boiler.
2. Close the isolating valves (4).
3. Connect a hose to the drain cock (7).
4. Open the drain cock to drain the primary circuit.



### Draining the domestic hot water circuit

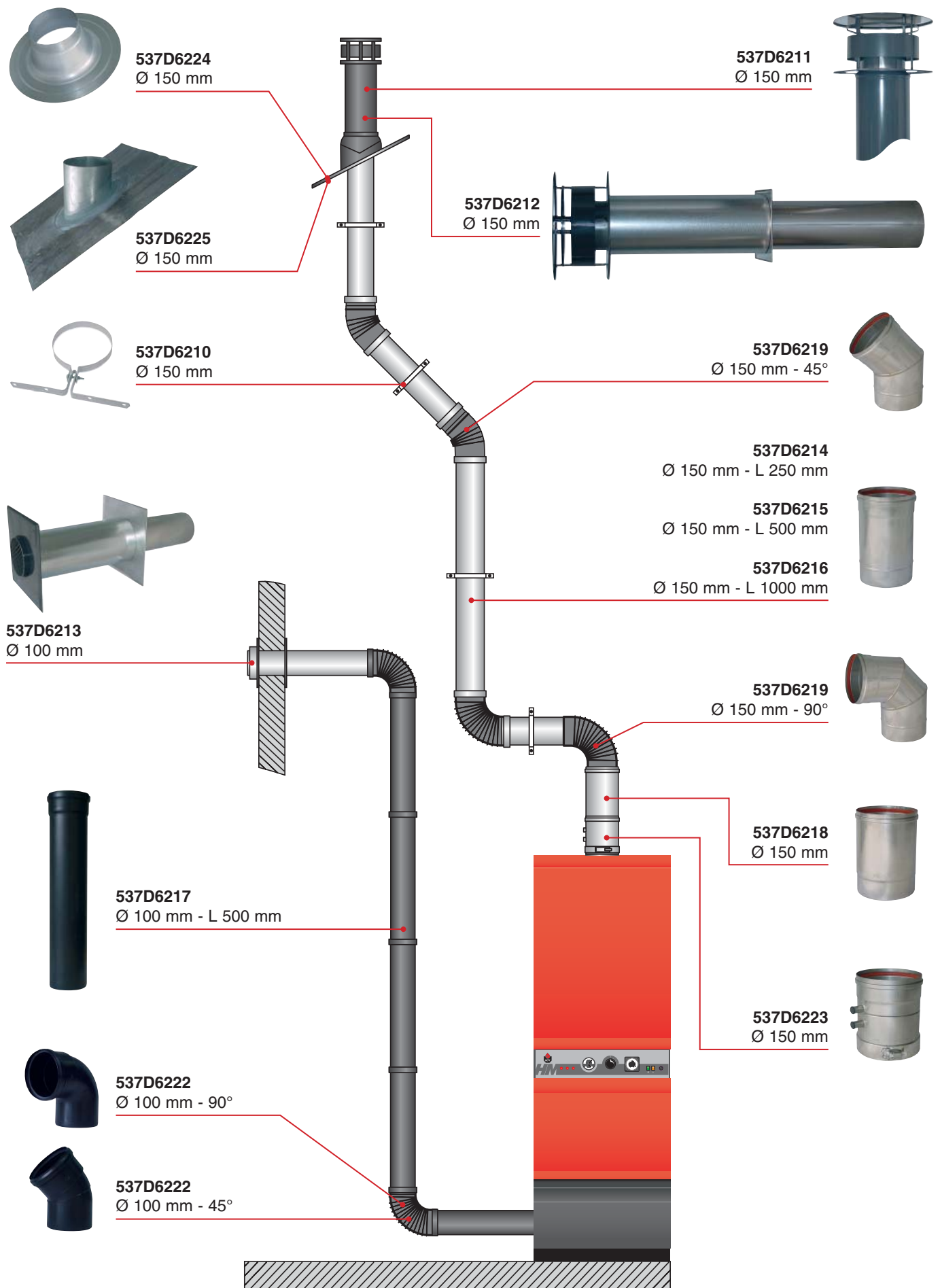
1. Turn OFF the on/off switch on the boiler control panel, isolate external electrical supply, and turn off the gas or oil supply to the boiler.
2. Release the pressure in the heating circuit until the pressure gauge indicates zero bar.
3. Close stop cock (1) and turn off tap (8).
4. Open valve (9) then valve (10) (first 9 then 10).
5. Let the water empty into the drain.

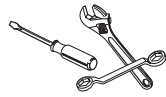


For the tank to be emptied, valve (9) must be situated at ground level.

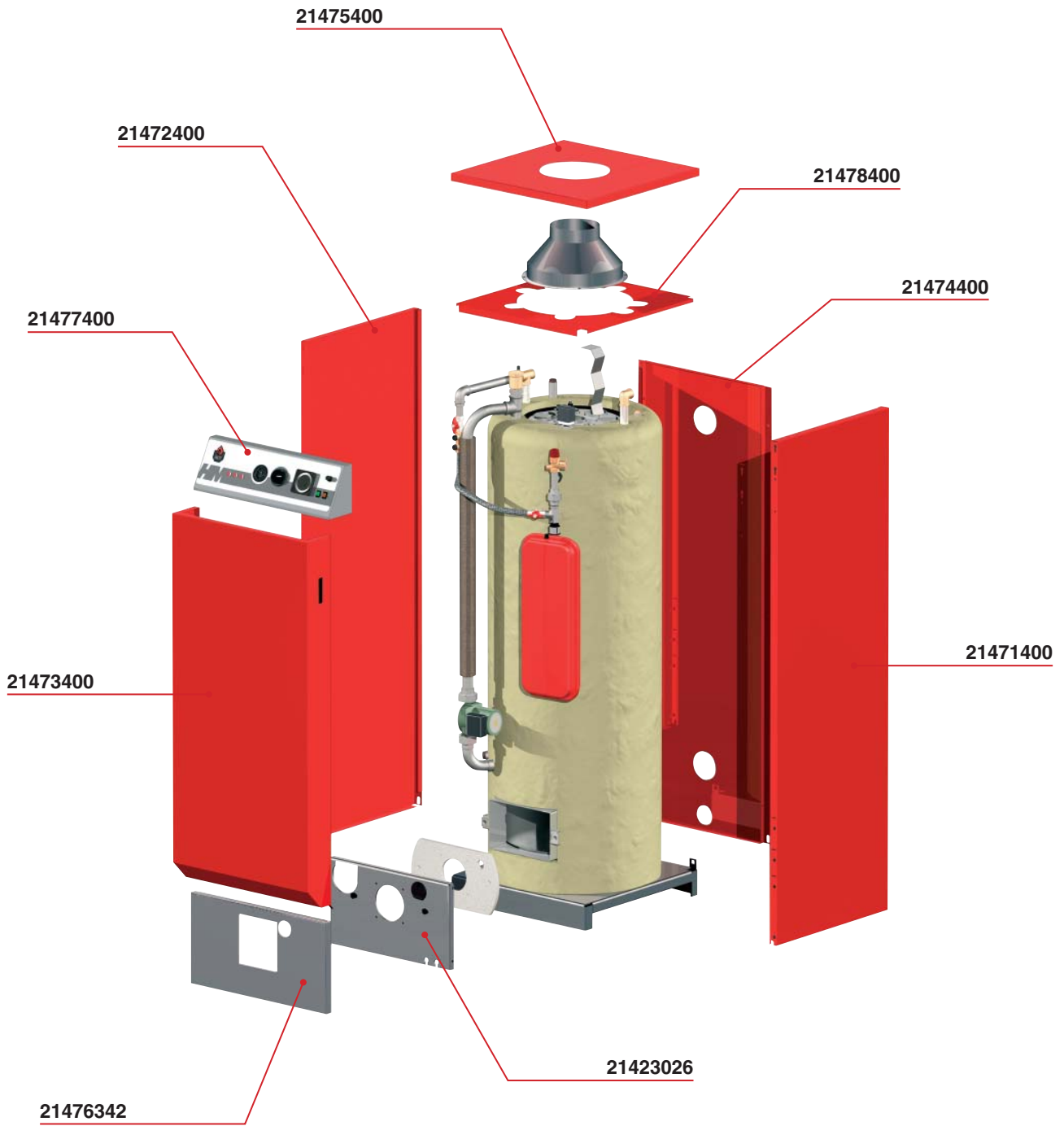


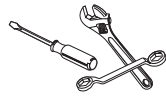
Handwriting practice area with multiple sets of horizontal lines (solid top and bottom lines with a dotted midline) for writing.





HeatMaster® 30 N / 60 N





### HeatMaster® 30 N / 60 N

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63438001

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49410039

507F2010

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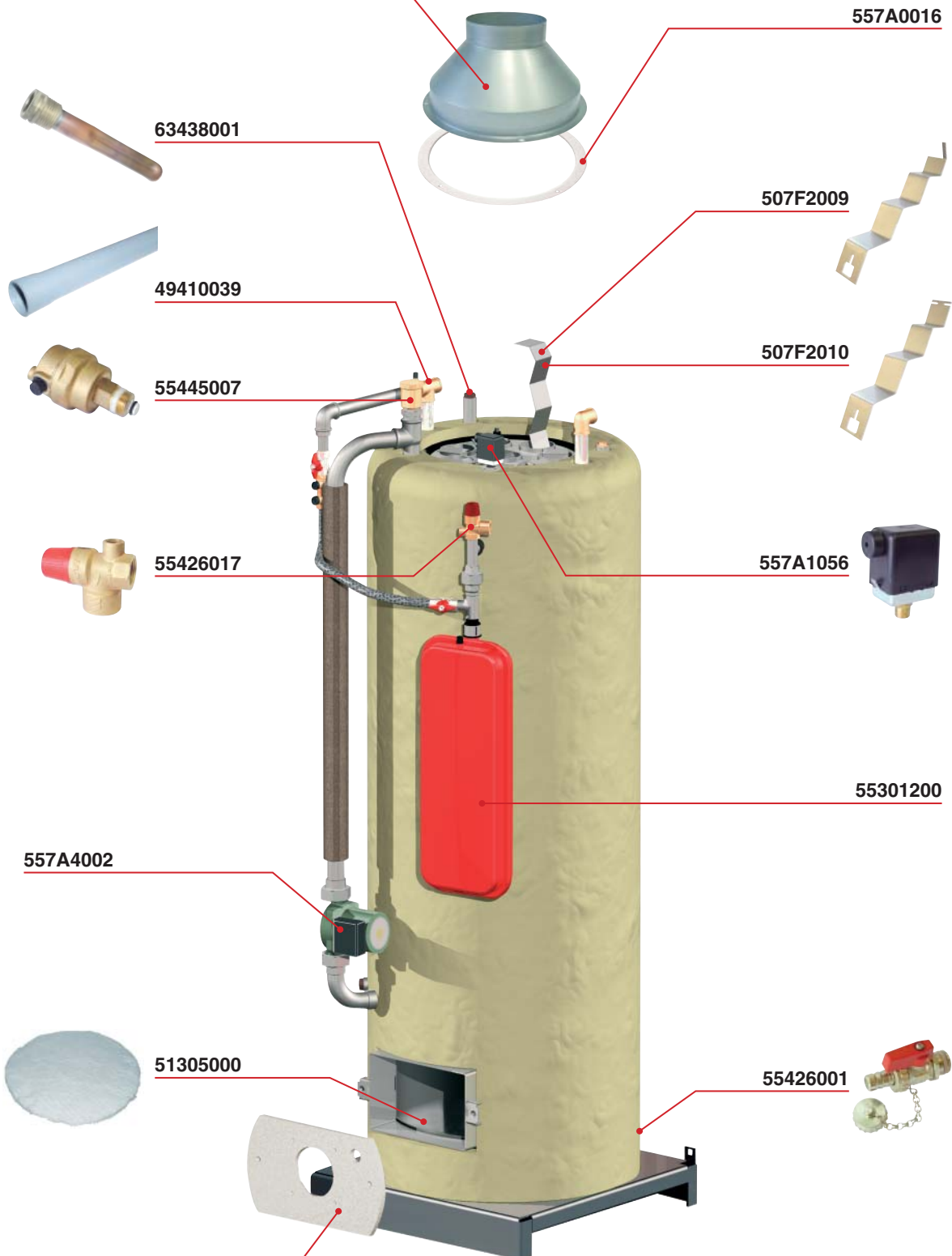
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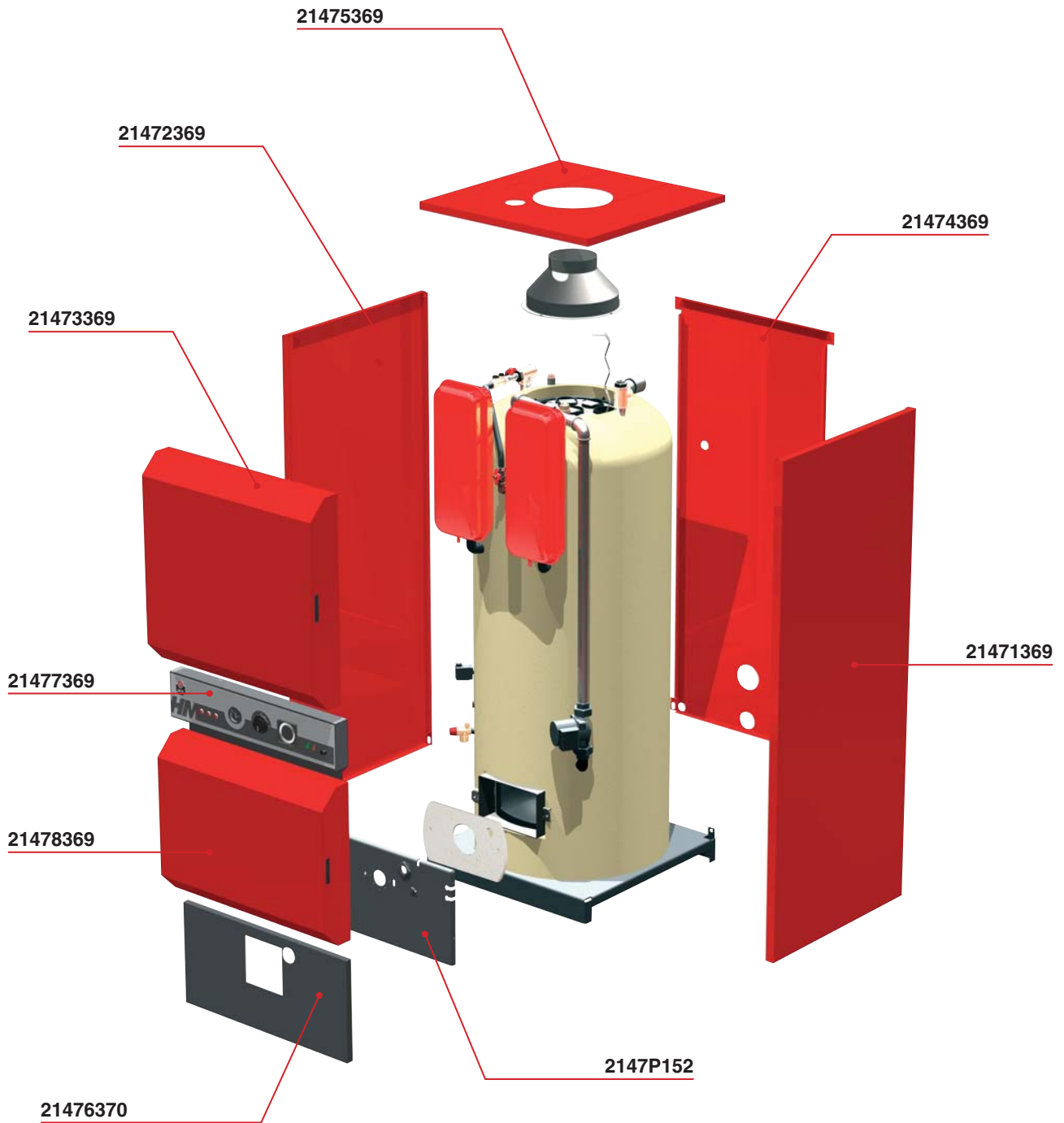
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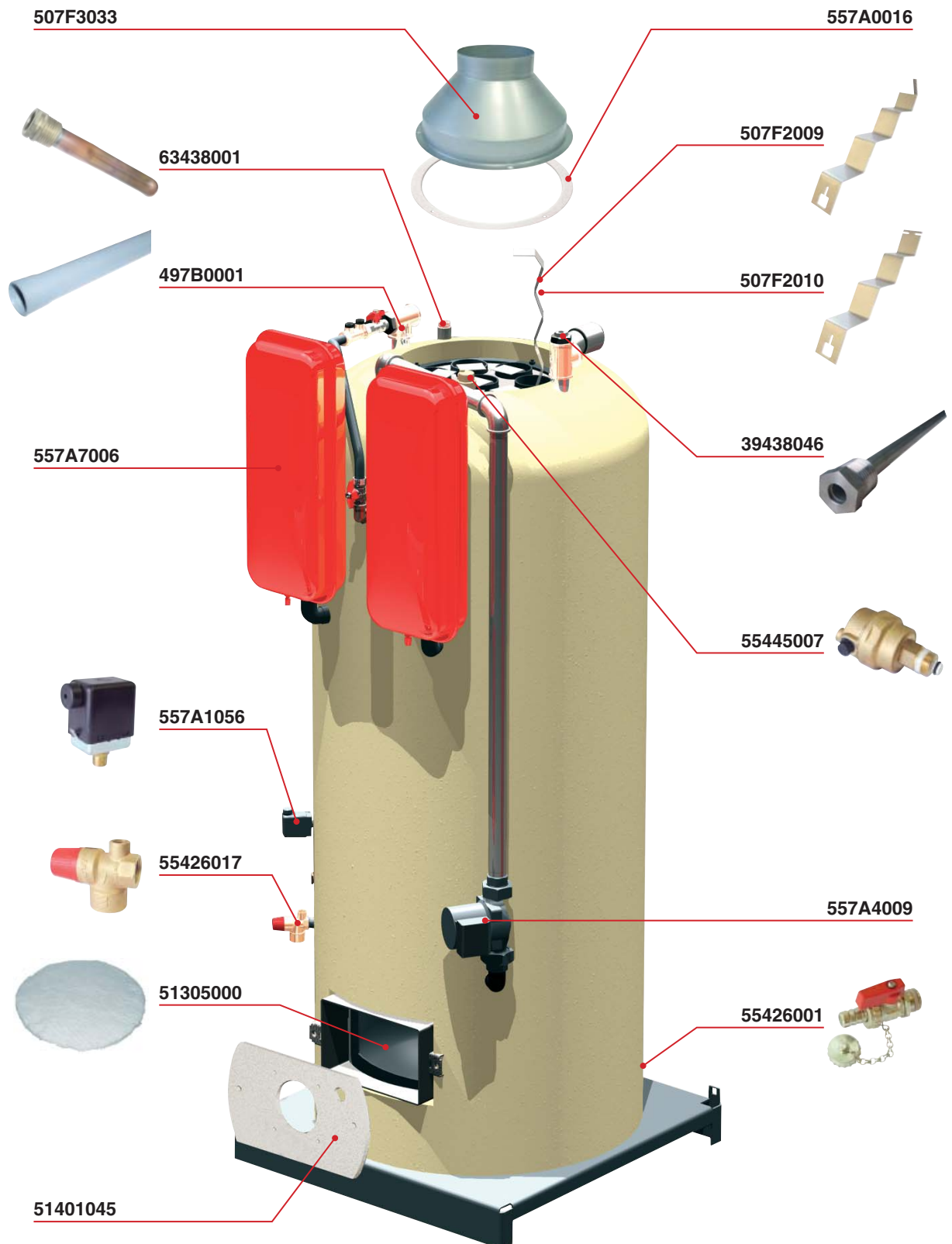
## HeatMaster® 70 N





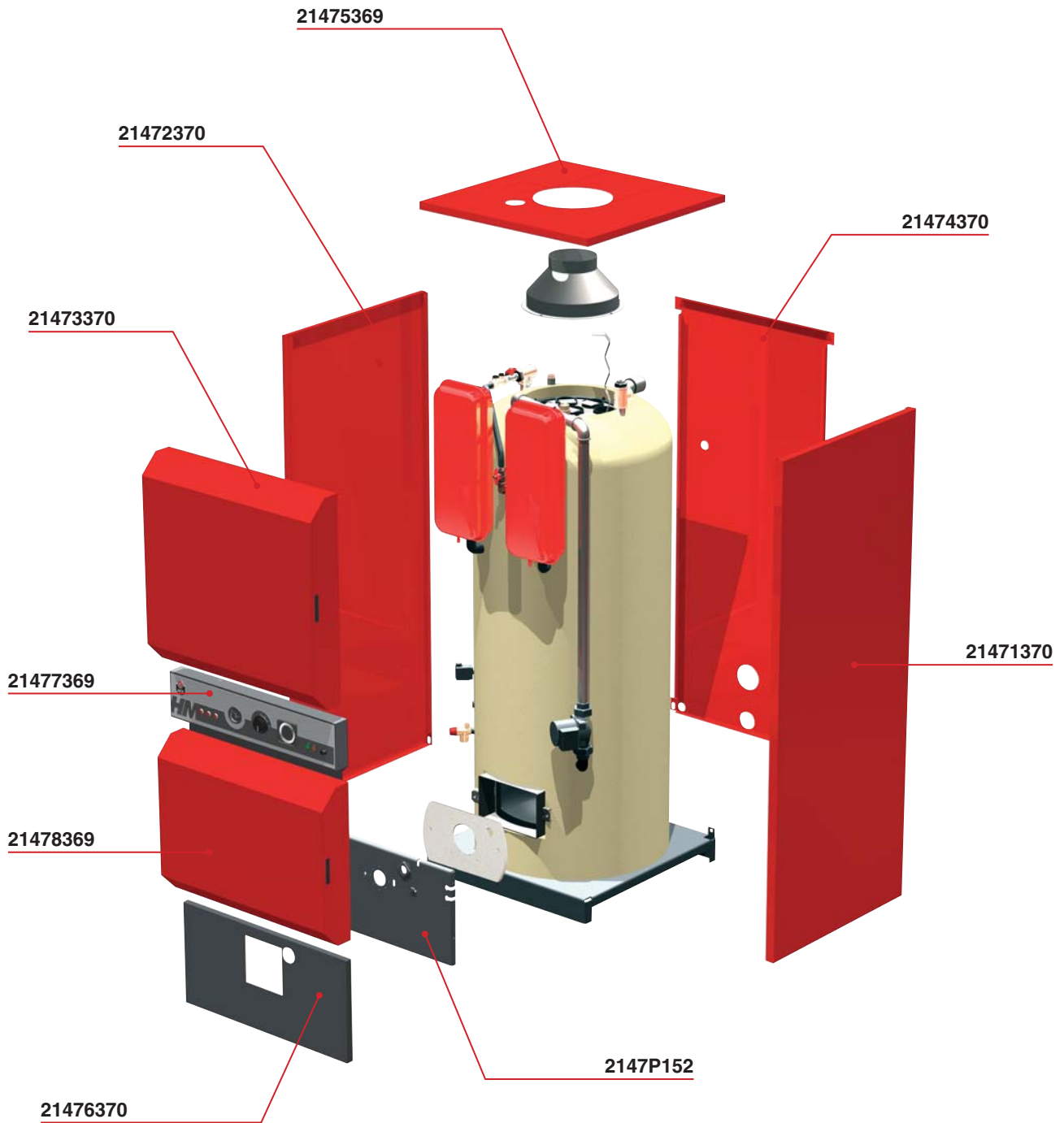


## HeatMaster® 70 N



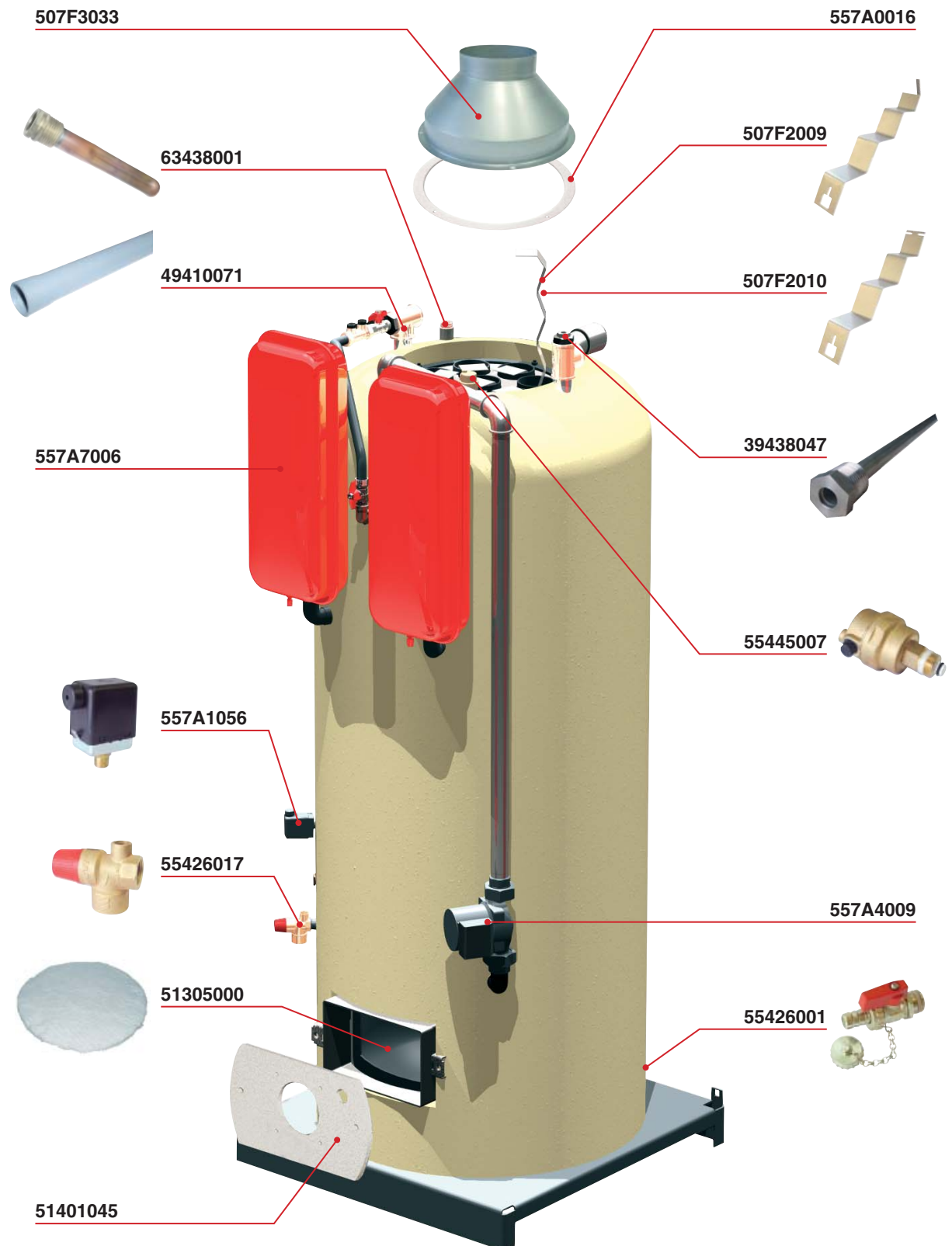


## HeatMaster® 100 N



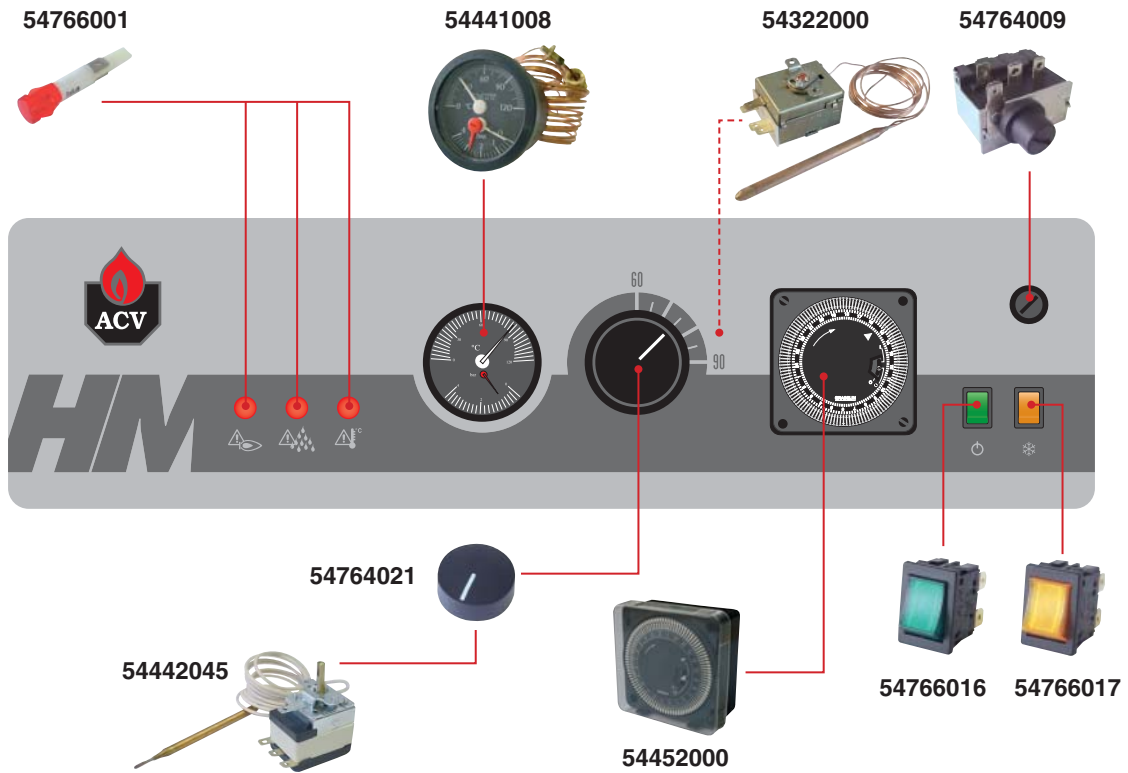


## HeatMaster® 100 N





### HeatMaster® 30 N / 60 N



### HeatMaster® 70 N / 100 N

